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BREAKING AND TRAINING COLTS.

SUGGESTIONS FOR TEACHING THE SUBJECT IN SECONDARY SCHOOLS.[1]

INTRODUCTION.

As the value of a horse depends much upon its training as a colt, so the value of the man depends to a great extent upon his training when a boy. In teaching agriculture the instructor should bear in mind that he is training the boys under him to be men of real worth. The successful training of horses demands that the trainer must be patient, gentle, and firm. If in teaching this subject something can be done toward developing these qualities it will be well worth while. In the high-school course it may not be possible to treat the subject in such a way that all members of the class will become proficient in the art of horse training. The treatment of the subject should be such, however, that an interest will be aroused that will result in the students becoming more observant of the ways of the horse and the methods of men who are successful in their handling.

RELATION OF SUBJECT TO COURSE OF STUDY.

This subject will fit naturally into the discussion of horses in connection with the course in animal husbandry. It may well follow a consideration of types and breeds and practice in judging. If mechanic arts is taught as a distinct subject, it is possible that exercises in rope work, harness fitting, and casting of animals may be a part of that course. If such be the case, there should be close correlation and cooperation with such work and the training of horses. It may be possible to combine the classes in carrying out the practicums and demonstrations.

CLASSROOM DISCUSSION.

Methods based on knowledge of horse.—While the breaking and training of horses is essentially a practical proceeding to be developed by practice, some time may be spent with

[1] Based on Farmers' Bulletin 667.

profit in the classroom discussing the principles upon which the practice is based. Copies of Farmers' Bulletin 667 should be secured for each member of the class and assignments made according to the time available for discussion and practice. The following questions should be suggestive in developing a discussion of the nature of the horse upon which methods of training are based:

1. What are the two main factors in the training of horses?
2. What is an instinct? A habit?
3. How would you begin to develop a habit?
4. How would you make the habit permanent?
5. How would you encourage a horse to do a thing?
6. How would you discourage a horse in any action?
7. Why should reward and punishment follow the act immediately?
8. In what spirit should punishment be given?
9. How are horses often made vicious?
10. What should the attitude of the horse be in regard to himself and his driver?
11. How can this attitude be developed?
12. Discuss briefly the cause of balkiness.
13. Why can not all horses be treated alike?
14. Why should the training of a horse begin when it is very young?

The student should understand the meaning of the term "breaking" as applied to the horse. Although it means simply that the horse is prepared for safe use in everyday work the use of the term is unfortunate, as men are often given the idea that the spirit and will of the horse are to be broken. The idea of training the colt so that its will and strength will be turned in the direction of the service of man should be emphasized.

Preparation for practice.—A discussion of the various practices in connection with the training and handling of colts will be most profitable in connection with the practicum in the presence of the animal. It will not be possible to carry out all the practicums which the bulletin may suggest. Hence the methods may be discussed in the class with the hope that they may be put into practice in the future in connection with a home project or other practical farm work. In discussing these methods the illustrations in the bulletin should be supplemented with such other illustrative material as may be obtained.

PRACTICUMS.

Rope work.[1]—A number of exercises sufficient to enable the student to tie the common farm knots, to make long and short splices, and to make a good rope halter may very well precede practice in throwing horses.

Fitting harness.—Students should become familiar with the common types of single and double harness and know how to fit them properly upon a horse. Special attention should be given the fitting of collars.

DEMONSTRATIONS.

Such exercises as breaking to lead, the trimming of feet, breaking to ride, casting or throwing, and breaking to drive do not afford an opportunity for all students to participate; hence they may be classed as demonstrations rather than as practicums. The students should participate in these exercises as far as possible. The instructor should select for any of these demonstrations such horses as may be handled without great danger. If the teacher has not had experience in this line of work it may be well to take advantage of the services of an expert. Whether the demonstration is to be held at the school or away from the school it

[1] Directions for rope work, fitting collars and harness, and a method for casting horses and cattle will be found in U. S. Dept. Agr. Farmers' Bul. 638, Laboratory Exercises in Farm Mechanics for Agricultural High Schools.

should be so planned that no time will be lost and the students may get the greatest value from the time spent. Each student should be required to make a detailed report of the work done.

HOME PRACTICE.

Much of the work connected with the training of colts must be carried on day after day at home. The lessons involved in the exercises suggested as school practicums and demonstrations may also be learned by the boys at home. If this home work has a definite relation to the work at school it may be recognized as a part of the school work and credit given for it Teaching a colt to lead, or breaking a horse to ride, may be assigned as an exercise in connection with the course in animal husbandry. When the student has demonstrated that the lesson is learned he is given credit as for any other phase of his school work.

A HOME PROJECT.

In connection with the study of horses a student may undertake the entire care and training of one or more colts as a home project. This project will involve perhaps all of the practicums suggested and will afford an opportunity for the application of all that is in the bulletin as well as the use of other references. In carrying out this project there should be an understanding that it is a part of the school course. There should be cooperation between the teacher and the student and his parents. If possible, the boy should have a financial interest in the work he is doing, i. e., if the colt does not belong to him, he should receive some reward in addition to school credit. The work should be supervised by the teacher or by some one having an interest in the boy and a knowledge of horses. The student should keep a detailed account of his work and make a written report of his projects. In correlating the project with the work at school and in systematizing the study of reference material a study outline made by the student with the aid of the teacher will be of value.

CONTROL OF GRASSHOPPERS.

SUGGESTIONS FOR TEACHING THE SUBJECT IN SECONDARY SCHOOLS.

INTRODUCTION.

Although the ravages of grasshoppers do not extend over any great portion of the country in any one year, sections in most of the States in the Union may be subject to their attacks. In the arid and semiarid regions especially a full harvest often depends upon the ability of the farmer to control these pests. As preventive measures are most efficient in control, this subject should be given some attention in all sections liable to attack even though there may be no immediate danger.

In classes in zoology or general biology the grasshopper is often studied as a type and used as a means of introducing students to a study of insects as a class. The interest of secondary students in this study may be increased by emphasizing the economic importance of insects. A study of methods of control is not only valuable in itself as a phase of agriculture, but should be of value also in stimulating an interest in a study of the nature and habits of insects as a phase of science.

RELATION OF SUBJECT TO COURSE OF STUDY.

Relation to course in science.—Such a study of the nature and habits of the grasshopper should form a part of a course in general biology or zoology. Where a special course in economic entomology is given, general methods of control as well as a study of the nature and habits of insects may be considered. In rural high schools the teaching of science should have a distinct relation to agriculture and rural life. It is better for the students

to learn the principles which underlie animal life through a study of local species of economic importance than to use mounted or preserved specimens of animals never seen alive in the community. In sections where grasshoppers may be troublesome a study of these insects in zoology will not only afford an opportunity to learn a great deal regarding the life processes of invertebrates, but should also be a means of arousing interest in a continued study of insects as a class and furnish a basis for an intelligent understanding of methods of control.

Relation to courses in agriculture.—As a rule, in secondary schools, it is best to consider pests in connection with the crops or animals affected. Most species of insects confine their feeding to a relatively few species of plants. Control measures often involve problems of crop management; hence it is better to consider pests of the orchard in connection with fruit growing, pests of the garden along with vegetable gardening, and enemies of field crops when the particular crop is taken up in agronomy. In a course in general agriculture there is not time to consider special crop pests; hence a number of general lessons are usually given to insects. In such lessons insects which affect the important crops of the district or those having a wide range of food plants may be selected as types. As the grasshopper has a wide range of food plants and the methods of control do not involve crop management to any great extent, its control may be considered apart from any particular phase of crop production. In general lessons on the control of insects in a brief course it is customary to classify insects with reference to the manner in which they take their food in relation to means of control. For example, the aphids are studied as a type of insects with sucking mouth parts which are controlled by a contact spray; the Colorado potato beetle may be taken up as a type of insects with biting mouth parts controlled by a poison spray. Although grasshoppers have biting mouth parts, they are not usually controlled by spraying and may be used to illustrate a type to which a variety of control measures are applied. If the students have studied the anatomy, classification, life history, and habits of insects in a general way such topics may be reviewed in their application to the control of grasshoppers. If the students have had no previous entomological instruction, it will be necessary to spend more time upon these topics before they can understand intelligently the reason for practical measures of control.

This subject may be treated best as soon after the opening of school in the fall as possible.

CLASSROOM INSTRUCTION.

Use of illustrative material.—The best place to study grasshoppers is out in the field where they are doing damage and where control measures may be applied. The teacher should be able to plan one or more field trips which will be very profitable, especially if any great number of grasshoppers is present. The breeding ground in the fall will afford a point of particular interest. Students should be encouraged to make individual observations of the habits of the insects and to make accurate notes for use in the class. In connection with the field trip specimens may be brought into the classroom. If for any reason the subject can not be studied in season, mounted specimens will prove helpful.[1] The specimens should represent the important local species in their different stages of growth.

Use of reference material.—Most texts in entomology and general zoology treat grasshoppers in a general way. Most of the bulletins which treat methods of control have a local application. Farmers' Bulletin 631, The Grasshopper Problem and Alfalfa Culture, and Farmers' Bulletin 691, Grasshoppers and Their Control on Sugar Beets and Truck Crops, come within this class, yet the material contained may be adapted to other sections. The latter bulletin is used as a basis for the suggestions which follow. This bulletin should be supplemented by other department bulletins and State publications where such may be obtained. The subject matter may be grouped under the three following heads: Basic knowledge of the

[1] For instructions regarding mounting of insects see U. S. Dept. Agr. Farmers' Bulletin 606 (1914), Collection and Preservation of Insects and Other Material for Use in the Study of Agriculture.

insects, natural enemies, and control measures. The following questions and statement under these headings are suggestive of topics to be treated.

Basic knowledge of insect.—(If the students have studied this subject as a phase of zoology it may now be treated in a brief review. If the common destructive species of the district do not correspond to the descriptions in the bulletin, the teacher should aid the students in identifying them with the aid of an insect manual. It may be necessary to send specimens to the State agricultural college for identification.) At what time and under what conditions are the eggs laid? (An effort should be made to hunt out the egg laying haunts as the destruction of eggs is an important means of control.) At what time do the eggs hatch? Describe the grasshoppers as they first appear. Explain their feeding habits and development. Why do we see few grasshoppers early in the morning or upon cold days? Why do not all grasshoppers have migratory habits? Why do migratory forms cause the greatest danger? Why does a drought prove not a serious check to their development? Do grasshoppers differ from most insects in regard to the variety of food they eat? What climatic conditions often prove of value as a check to their increase?

Natural enemies.—What are the two most effective enemies of grasshopper eggs in Kansas? Do you find any parasites in the eggs of grasshoppers in this district? (If new parasites are found a report should be made to the State agricultural college or the State entomologist; it may be necessary to send specimens along for identification.) What other animals may destroy eggs? Do you find any of the red mites which appear to weaken the grasshoppers? Have you seen wasps, spiders, or beetles attack them? What will the presence of maggots in the bodies of grasshoppers indicate? Why are toads and lizards of benefit to the farmer? What other animals may prove of value in destroying grasshoppers? What birds in particular destroy large numbers of grasshoppers in your district? In what way do farmers use poultry to check the insects? What fungus parasite may destroy them? How can you recognize the presence of this disease?

Control measures.—Why is control of a migratory species a community problem? Why is destruction of the eggs and young more economical than destruction of the adults? Why are egg-laying haunts often not reached in plowing? Under what conditions is the harrow of benefit? Under what conditions will hogs prove of value in egg destruction? How may sod areas and clumps of egg-infested grass be handled? (If it is not convenient to prepare and use poisoned bran mash and the hopperdozer as practicums, attention should now be given in the classroom to these methods of control.) Under what conditions will burning be effective in the destruction of grasshoppers?

Application of general methods of control.—After measures of control have been discussed in a general way it will be well to apply these measures to the control of grasshoppers upon a particular class of crops, as done in two of the bulletins suggested under reference material.

PRACTICUMS.

Preparation and use of poisoned bran mash.—Complete directions for the preparation and use of the poisoned bait are given on page 10 of Farmers' Bulletin 691. This material should be mixed by the students and used upon the school grounds, at the home of one of the students or upon the farm of some school patron, wherever it will do the most good. The quantity may be modified to suit conditions.

Construction and use of a hopperdozer.—In sections where there is need of a campaign against grasshoppers the students may not only get good practice in making a hopperdozer but will accomplish good community work in making and using one as a model. Complete directions for making and using this machine are given on pages 11 and 12 of Farmers' Bulletin 691.

REFERENCES.

Experimental Work with Fungous Diseases of Grasshoppers, U. S. Dept. Agr. Yearbook, 1901.
The Grasshopper Problem and Alfalfa Culture, U. S. Dept. Agr. Farmers' Bulletin 637 (1915).
Grasshoppers and Their Control on Sugar Beets and Truck Crops, U. S. Dept. Agr. Farmers' Bulletin 691 (1915).

AN ANALYSIS OF THE FARM BUSINESS.

METHODS FOR TEACHING THE SUBJECT IN SECONDARY SCHOOLS.[1]

INTRODUCTION.

If the students of agriculture are to become successful farmers they must understand the business side of farming as well as agricultural practice. Appreciation of this fact is leading to a greater consideration of farm management and elementary rural economics in secondary schools. As a large number of the Farmers' Bulletins of this department have a bearing upon these subjects, a list of these bulletins is given for the benefit of teachers who desire to supplement their texts with other material. The suggestions which follow aim to show how one of these publications may be used.

THE COMMUNITY SURVEY.

The successful teacher of agriculture adapts the course he is giving to the community in which his students live. To accomplish this, the teacher must know the school district and its needs. He must understand the home conditions surrounding his pupils as well as the conditions under which they will apply the agricultural principles taught. It is especially important that the teacher must know well the home farms of the patrons of the school and the community in general if he is going to extend his service beyond the school. The teacher who has been reared in the district has the advantage in knowing more about local conditions. The instructor who comes from another section may do much toward overcoming his handicap by making a systematic endeavor to learn community conditions and needs. He may accomplish this purpose and at the same time give valuable training to his students by having them assist him in making a survey of the community. This survey should be conducted for the purpose of studying economic and social conditions with a view of aiding in their improvement. As a basis for understanding economic conditions, and as a means of rendering aid to individual farmers, an analysis of the business of individual farms has great value if conducted according to directions in Farmers' Bulletin 661.

RELATION OF SUBJECT TO COURSE OF STUDY.

A phase of farm management.—An analysis of the farm business is naturally a phase of farm management, which subject deals with the business side of farming. In order to conduct a farm as a successful business it is necessary to understand the scientific principles underlying farm practice, hence a course in farm management should be given after such courses as agronomy, animal husbandry, and horticulture in which the principles and practice of production are considered. An analysis of the farms of the community may very well be made a basis for a study of methods of farm management. If the course is to fit the needs of the community, the class must understand what those needs are. The home farms of the students should be of most importance in the class, therefore each student should make an analysis of his own home farm. The wider the study the greater its value. If the teacher has time to make a study of the other farms in the district a sufficiently large number will be involved so that averages may be fairly accurate. It is possible that there may be several older students who may be tactful and discreet enough to render aid to the teacher in securing accurate

[1] Based on Farmers' Bulletin 661.

information from other farmers. The average may be used as a basis for comparison. The analysis may be considered a diagnosis in the case of those farms paying a low labor income. The better-managed farms will suggest remedies. In the course in farm management there should be close correlation between the analytical study of the farm business and the work in farm accounts. The analysis will suggest accounts to be kept as well as a need for accurate farm accounting.

An aid in other courses in agriculture.—The information received in an individual farm analysis should be of such value to all phases of agriculture that it should be worth while to conduct such a study although a special course in farm management is not given. A definite knowledge of the number and kind of live stock kept in the district, especially on the home farms of the students, should aid the teacher in adapting the course in animal husbandry to the school. Likewise a knowledge of field crops and vegetables grown and the number and kind of fruit trees will aid in courses in agronomy and horticulture. The remedy for a lack of success in the farm business often lies in better farm practice. In connection with all the courses in agriculture a study should be made of the practices of the district, especially those of the most successful farmers. The farm analysis will show who the successful farmers are. In a course in general agriculture the farm analysis may be used as in the more special courses, but necessarily in a more limited way. The younger students who aid in making reports of their home farms will find a needed opportunity for application of farm arithmetic in computing the results of the analysis.

A HOME PRACTICUM.

Each student should be given a copy of the bulletin containing the blanks for him to fill out with the aid of his parents. It may be necessary in some cases for the teacher to visit the parents and explain the nature of the work and how the information is to be used. Such home work should result in bringing the home and the school more closely together. As a rule parents will take more interest in the school if the teacher manifests an interest in the home and a desire to apply school work to home needs. The teacher should be sure that the student understands how the blanks are to be filled out. At least one period may be devoted to a discussion of the instructions given in the bulletin. If the teacher explains the similarity of the work to that of the farm survey investigations, it will aid in developing a scientific spirit in the work and impress the need for accuracy and its value in the results obtained. As the results of the study are to be made a basis for future discussions of methods, this work should be done as near the opening of school in the fall as possible.

CLASSROOM INSTRUCTION.

After the individual reports are brought in the students should aid the teacher in summarizing the results and in computing averages. The time spent in a discussion of the results of the study will depend upon the extent of the course. In a course in farm management the results of the farm analyses will be utilized throughout the greater part of the course. In a course in general agriculture, one or more periods may be devoted to a comparison of the results, a study of causes, and suggestive remedies. In such a course this discussion should be utilized by the instructor as a means of impressing upon the minds of the students some of the fundamentals of farm management.

Considerable discretion must be used by the teacher in securing information and utilizing it in the class and for the good of the community. In most cases it will be necessary to omit the name of the owner of the farm and designate the farm by number.

The topographic maps of the United States Geological Survey and the reports and maps of the county soil surveys of the Bureau of Soils of this department may be used to advantage in

connection with the study of the farms of the communities in the counties where such surveys have been made. Each student should make a map or plan of the home farm drawn accurately to scale in connection with the report.

A HOME PROJECT.

If the analysis of the farm business is made comprehensive enough to involve the keeping of accurate records and accounts throughout the year it may be considered a worthy home project. Such a project should be considered as a practical application of the principles of farm accounting. There are some students taking courses in agriculture in secondary schools upon whom falls the responsibility of the management of the home farm. By connecting such work in a definite way with the instruction in farm management this work may become a valuable home project. The farm analysis and the keeping of farm records become in this case a subproject of the more comprehensive one.

COOPERATION.

An analysis of the farm business has proved of such value in the attempts made to improve farming conditions that county agents and other representatives of the State agricultural colleges and this department are doing considerable work along this line. Wherever farm surveys have been made, or extension workers have made a study of the business of farming in local areas, the teacher of agriculture should utilize the results of this work as far as possible. The teacher of agriculture and his students may render valuable aid to other workers who are making studies over more extensive areas. It is not essential that there be a duplication of effort. The work done through the school should be of such a high character that it may be used by others.

In some districts the agricultural instructor is doing most of his local extension work through farmers' clubs. A study of individual farms according to a systematic method is a good way in which such a club may begin a campaign of mutual helpfulness.

FARMERS' BULLETINS FOR REFERENCE.

310. A Successful Alabama Diversification Farm. 1907.
312. A Successful Southern Hay Farm. 1907.
355. A Successful Poultry and Dairy Farm. 1909.
370. Replanning a Farm for Profit. 1909.
398. Farm Management in the Use of Commercial Fertilizers in the South Atlantic States. 1910.
432. How a City Family Managed a Farm. 1911.
437. A System of Tenant Farming and Its Results. 1911.
454. A Successful New York Farm. 1911.
472. Systems of Farming in Central New Jersey. 1911.
511. Farm Bookkeeping. 1912.
519. An Example of Intensive Farming in the Cotton Belt. 1912.
572. A System of Farm Cost Accounting. 1914.
593. How to Use Farm Credit. 1914.
614. An Efficient Farm System for the Corn Belt. 1914.
635. What the Farm Contributes Directly to the Farmers' Living. 1915.
654. How Farmers May Improve Their Personal Credit. 1915.
703. Suggestions for Parcel Post Marketing. 1915.
704. Grain Farming in the Corn Belt, with Live Stock as a Side Line. 1915.

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